

What is claimed is:

- 1 1. A mixer/flow conditioner comprising:  
2 at least three successive partitions defining at least two gaps therebetween;  
3 means within each gap defining a plurality of passages, at least one passage in  
4 each gap being oriented to impart a tangential velocity component to a  
5 packet passing therethrough; and wherein  
6 the at least one passages cooperate to convert an initial flow stream into a final  
7 flow stream having a swirl number less than about 0.2.
  
- 1 2. The mixer/flow conditioner of claim 1 wherein the means within each gap for  
2 defining a plurality of passages is a corrugated strip.
  
- 1 3. The mixer/flow conditioner of claim 1 wherein the swirl number is less than  
2 about 0.03.
  
- 1 4. The mixer/flow conditioner of claim 3 wherein the swirl number is less than  
2 about 0.02.
  
- 1 5. The mixer/flow conditioner of claim 1 wherein the plurality of passages each  
2 have an exit defining a hydraulic diameter and a length and the passages  
3 within an individual gap have an equal length to hydraulic diameter ratio.
  
- 1 6. The mixer/flow conditioner of claim 5 wherein the passages in adjacent gaps  
2 have orientations that are opposite each other whereby the passages in one gap  
3 impart a clockwise swirl and the passages in the other gap impart a counter-  
4 clockwise swirl.
  
- 1 7. The mixer/flow conditioner of claim 5 wherein the orientation of the passages  
2 within an individual gap are identical.

1 8. The mixer/flow conditioner of claim 7 wherein the passages in adjacent gaps  
2 have orientations that are opposite each other whereby the passages in one gap  
3 impart a clockwise swirl and the passages in the other gap impart a counter-  
4 clockwise swirl.

1 9. The mixer/flow conditioner of claim 5 wherein all the passages have an  
2 orientation.

1 10. The mixer/flow conditioner of claim 1 wherein the partitions are  
2 approximately concentric.

1 11. The mixer/flow conditioner of claim 10 wherein there are at least 6 gaps.

1 12. The mixer/flow conditioner of claim 10 wherein adjacent gaps act as pairs.

1 13. The mixer/flow conditioner of claim 1 wherein the orientation of the passages  
2 is less than about 80 degrees relative to the central axis.

1 14. The mixer/flow conditioner of claim 13 wherein the orientation of the  
2 passages in two adjacent gaps defines an included angle between 15 and 60  
3 degrees.

1 15. The mixer/flow conditioner of claim 13 wherein the passage has a length and  
2 an exit defining a hydraulic diameter, and the passages having a length to  
3 hydraulic diameter ratio less than about 10.

1 16. The mixer/flow conditioner of claim 15 wherein the length to hydraulic  
2 diameter ratio is greater than about 0.5.

1 17. The mixer/flow conditioner of claim 1 further comprising an outer gap having  
2 means for defining channels wherein the channels have an orientation that  
3 generally only has an x component.

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1 18. A mixer/flow conditioner for conditioning comprising:  
2 at least two partitions defining a gap;  
3 at least two corrugated strips positioned in the gap, each strip defining a  
4 plurality of passages, each passage having an orientation; and wherein  
5 the passages cooperating to produce a swirl number less than 0.2.

1 19. The mixer/flow conditioner of claim 18 wherein the swirl number is less than  
2 0.03.

1 20. The mixer flow conditioner of claim 19 wherein the swirl number is less than  
2 0.02.

1 21. The mixer/flow conditioner of claim 18 wherein the plurality of passages each  
2 have an exit defining a hydraulic diameter and a length and the passages  
3 within an individual gap have an equal length to hydraulic diameter ratio..

1 22. The mixer/flow conditioner of claim 21 the passages in adjacent gaps have  
2 orientations that are opposite each other whereby the passages in one gap  
3 impart a clockwise swirl and the passages in the other gap impart a counter-  
4 clockwise swirl.

1 23. The mixer/flow conditioner of claim 22 wherein the gaps are concentric.

1 24. The mixer/flow conditioner of claim 23 wherein the gaps act in pairs.

1 25. The mixer/flow conditioner of claim 24 wherein the orientation of adjacent  
2 gaps is opposite one to the other and the sum of the angular momenta of the  
3 packets exiting the passages of adjacent gaps are equal to about zero.

1 26. The mixer/flow conditioner of claim 25 wherein there are at least 6 gaps.

1 27. The mixer/flow conditioner of claim 18 wherein the orientation is less than  
2 about 80 degrees relative to the central axis.

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- 1 28. The mixer/flow conditioner of claim 27 wherein the orientation of two
- 2 adjacent gaps defines an included angle between 15 and 60 degrees.
- 1 29. The mixer/flow conditioner of claim 27 wherein each passage has an exit
- 2 defining a hydraulic diameter and a length, and the length to hydraulic
- 3 diameter ratio is less than 10.
- 1 30. The mixer/flow conditioner of claim 29 wherein the length to diameter ratio is
- 2 greater than 0.5.
- 1 31. The mixer/flow conditioner of claim 30 wherein the orientation of the
- 2 passages within a gap are identical.
- 1 32. The mixer/flow conditioner of claim 18 further comprising an outer gap
- 2 having means for defining channels wherein the channels have an orientation
- 3 that generally only has an x component.